

Maturing, Ripening and Softening of Florida Avocados.

by

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The changes that occur in avocados during their maturing, ripening, and softening periods were studied to obtain data that could serve for a practical standard for determining the quality of the fruit. The project was cooperative with the University of Florida, Sub-tropical Experiment Station, Homestead, Florida, leading avocado growers and shippers, Homestead, Florida, and U. S. Department of Agriculture, Orlando, Florida, participating.

Oil Content vs. Picking dates and Sizes of fruit

A minimum oil content is the basis for maturity in certain areas that produce avocados. In Florida, a minimum oil standard has not proven practical. The reasons are probably due to the large number of commercial varieties grown, their time of harvest, and the wide range of oil content among fruits. In recognition of these conditions, Florida growers and shippers suggested for experimentation, standards based on "picking dates and size of fruit". The proposed standards were published by Mr. Charles H. Staffani, Dade County Agricultural Agent, Homestead, Florida, August 4, 1953. The announcement preceded the marketing of the bulk of the 1953-54 crop.

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Oil Content Determined at Homestead

The oil content of avocado fruits was given major study at Homestead, Florida. The tests were on comparable fruit to those used in maturing, ripening and softening studies at Orlando, Florida.

Ripening and Quality Studies at Orlando

The work at Orlando included ripening of fruit at 75°F., and the determination of rate of softening, loss in weight, and change in flavor. A score card was devised for testing taste or flavor. All the lots were rated according to the arbitrary standard scale on the score card reproduced below.

SCORE CARD FOR TESTING TASTE OR FLAVOR OF AVOCADOS

Arbitrary Standard	Taste or flavor of fruit	Numerical Rating Range Corresponding to description	Individual Numerical Rating
Green	Green, grassy bitter, unpleasant after taste, unpalatable and rubbery to soft texture (Does not meet consumer acceptance)	50 - 59	
Unpalatable	Flat, watery, slightly bitter, slightly unpleasant after taste and rubbery to soft texture (Does not meet consumer acceptance)	60 - 69	
Palatable	Smooth, mellow, watery, satisfactory flavor and firm to soft texture (Meets minimum standard of consumer)	70 - 79	

Standards based on Picking date and size of fruit

Arbitrary Standard	Taste or flavor of fruit	Numerical Rating Range Corresponding to description	Individual Numerical Rating
Green	Green, grassy bitter, unpleasant after taste, unpalatable and rubbery to soft texture <u>(Does not meet consumer acceptance)</u>	50 - 59	
Unpalatable	Flat, watery, slightly bitter, slightly unpleasant after taste and rubbery to soft texture <u>(Does not meet consumer acceptance)</u>	60 - 69	
Palatable	Smooth, mellow, watery, satisfactory flavor and firm to soft texture <u>(Meets minimum standard of consumer acceptance)</u>	70 - 79	
Excellent	Smooth, mellow, tasty, rich, nutty with quality of distinct excellance and buttery texture <u>(Excellent)</u>	80 - 100	

Underscore or write in character or characters that determined your rating.

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About 200 different lots of fruit, representing 17 commercial varieties were tested. The principal study was with Waldin, Booth 8, Lula, Booth 7, Hickson, Taylor, Hall, Booth 1, and Booth 3. On the other hand, limited study was with Pollock, Trapp, Pinnelli, Tonnage, Collinson, Herman, Wagner, and Choquette. See Table 1.

The rate of softening of fruit at 75° F. was fairly uniform and eating condition (1 to 3 pounds) was reached in 3 to 10 days, averaged 5 days.

The loss in weight of fruit during the softening period at 75° F. averaged about 5 percent.

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Table 1. Maturity of Avocados in relation to picking dates and size of fruit, 1953-54.

Variety	Picking Date 1/	Size 1/ oz.	Grower	Lots Tested	Earliest Picking Date	Size (oz.) Minimum Range	Days at 75°F. 2/ Average Range	Loss in Weight at 75°F. Pct.	Numerical Flavor Rating		
Buchs	June 15	14		None							
Pollock	July 1	16									
Simmonds	July 1	16		None							
Aldin	August 7	16	A B C J D	6 7 2 1 1	August 12 August 12 August 12 August 5 August 19	15 14 15 14 16	9-18 7-17 11-16 6-15 14-17	6 7 6 6 5	4-10 6-10 4-11 5-7 3-7	5.3 8.2 6.9 .5 4.7	72 72 72 70 75
Trapp	August 15	14	D F	1 1	August 19 August 16	14 14	13-16 10-15	6 4	3-7 3-6	6.5 7.7	72 70
Pinnelli	August 15	14	F	1	Sept. 16	16	13-19	4	3-4	3.3	72
Tonnage	August 15	--	G	1	August 15	16	14-17	6	6	5.3	75
		--	G	1	August 15	10	9-11	7	6-7	8.1	70
Booth #8	Sept. 15	16	A B D	12 14 10	Sept. 16 Sept. 16 Sept. 22	13 12 9	6-15 7-12 7-10	6 5 5	3-8 4-7 3-9	9.3 8.8 6.5	70 70 72
Lula	Oct. 1	14	A B D	18 17 10	Sept. 16 Sept. 16 Sept. 29	14 16 16	9-16 12-17 9-17	5 5 5	4-5 4-5 3-5	8.1 6.6 8.8	73 73 72
Booth #7	Oct. 15	14	A C	8 9	Sept. 29 Sept. 29	20 17	14-23 13-17	6 6	4-7 4-8	6.5 6.2	73 72

1/ Temporary picking dates and sizes recommended by Growers and Shippers and published August 4, 1953 by Charles H. Steffani, Dade County Agricultural Agent, P. O. Box 112, Homestead, Fla.

2/ The softening period at 75°F. does not include time of transit of 2 or 3 days from Homestead, Florida to Orlando, Florida.

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Table 1. Maturity of Avocados in relation to picking dates and size of fruit, 1953-54. (Continued)

Variety	Picking Date 1/	Size ¹ oz.	Grower	Lots Tested	Earliest Picking Date	Size (oz.) Minimum Range	Days at 75°F. ² Average Range	Loss in Weight at 75°F. Pct.	Numerical Flavor Rating
Hickson	Oct. 15	16	A	7	Oct. 13	14 9-15	4 3-7	4.0	70
			C	5	Oct. 13	15 9-19	5 4-6	1.7	70
			H	2	Oct. 18	13 11-15	5 5-6	.7	75
Collinson	Oct. 15	22	D	2	Oct. 27	17 15-19	3 3	4.3	70
Taylor	Nov. 1	16	B	9	Nov. 10	11 9-16	5 4-5	5.2	75
			C	6	Oct. 22	13 11-15	4 4-5	3.6	70
Hall	Nov. 1	16	C	9	Nov. 10	17 14-27	6 5-6	3.8	70
			D	6	Nov. 10	28 21-30	6 5-6	4.5	75
Herman	Nov. 1	10	A	2	Nov. 11	15 13-17	5 5	4.8	80
Monroe	Nov. 1	10	None						
Booth #1	Nov. 15	15	A	2	Oct. 22	14 14-20	4 4-5	3.7	70
			C	6	Oct. 22	15 14-24	4 4	2.7	70
Booth #3	Nov. 15	14	C	4	Oct. 22	19 14-23	4 3-4	4.2	70
			D	10	Oct. 22	13 12-19	4 4-5	3.3	70
Other	Dec. 1	14	D	2	Dec. 16	10 9-10	5 4-5	0	72
Abal	Dec. 15	16	None						
Choquette	Jan. 1	16	I	1	Dec. 8	48 46-51	3 3-4	3.4	75
Itzamna	Feb. 1	16	None						

1/ Temporary picking dates and sizes recommended by Growers and Shippers and published August 4, 1953 by Charles H. Steffani, Dade County Agricultural Agent, P. O. Box 112, Homestead, Fla.

2/ The softening period at 75°F. does not include time of transit of 2 or 3 days from Homestead, Florida to Orlando, Florida.

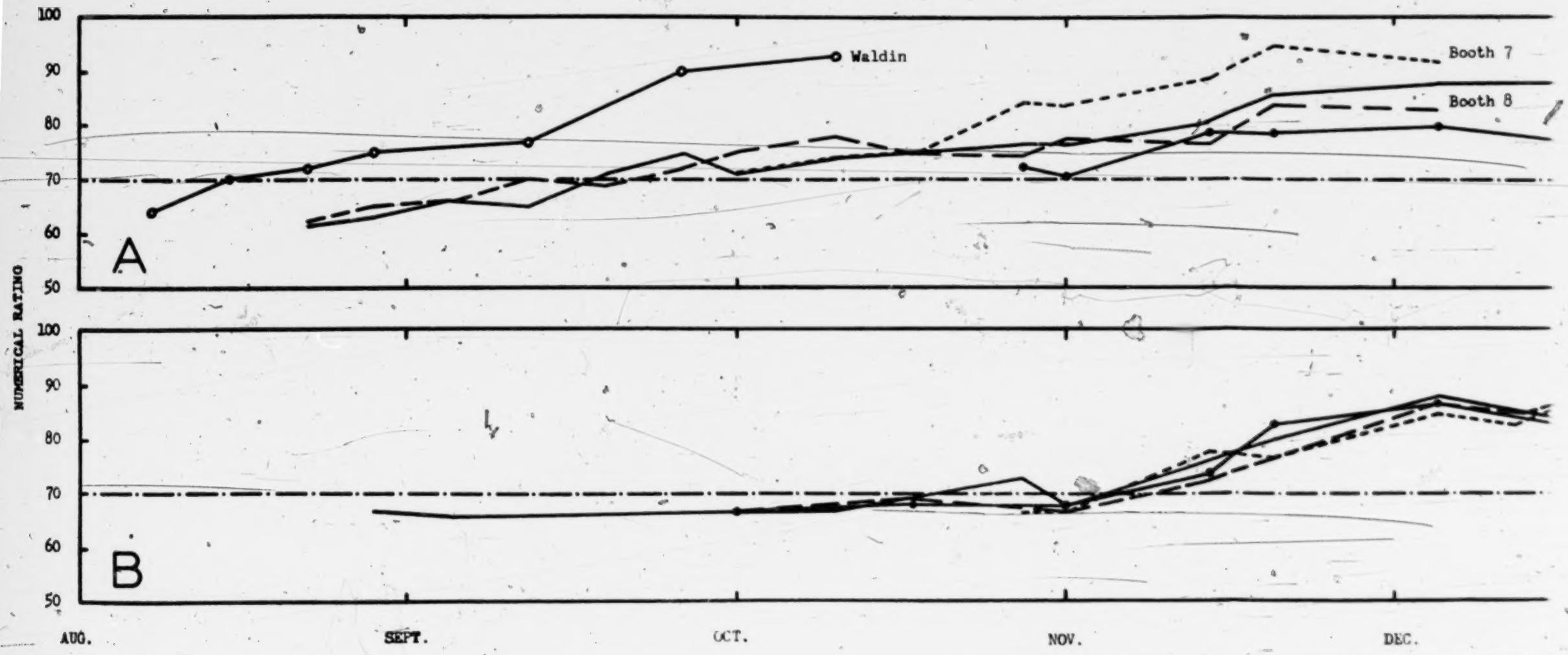
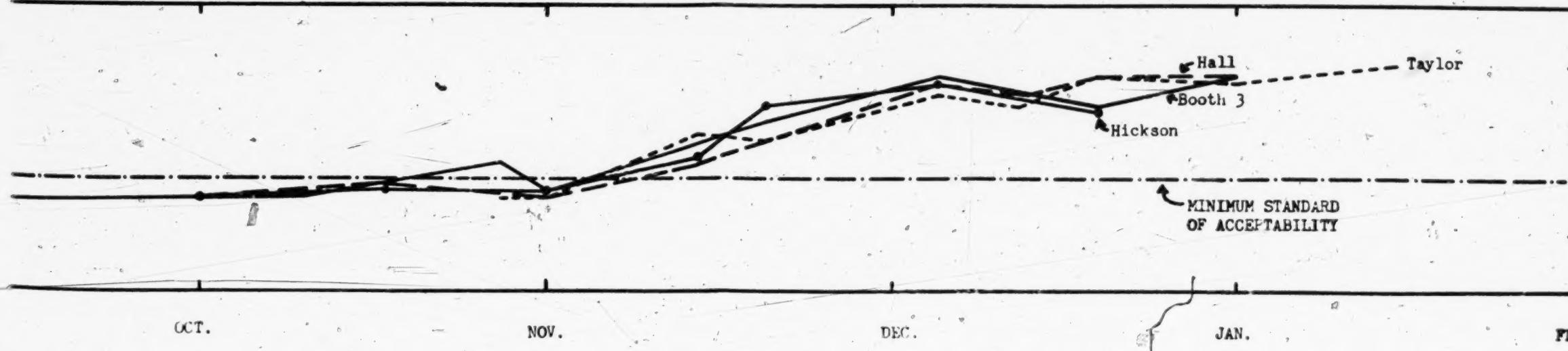
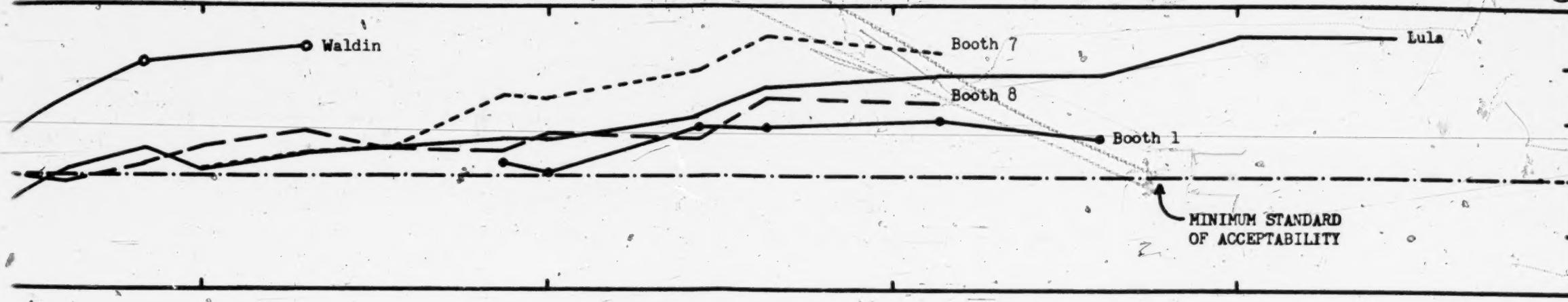


Figure 1.—Seasonal changes in palatability of Florida avocados. A and B represent the principal early and midseason varieties, 1953-54.

Ex 5



OCT.

NOV.

DEC.

JAN.

FEB.

PICKING PERIOD

ados. A and B represent the principal early and midseason varieties, 1953-54.

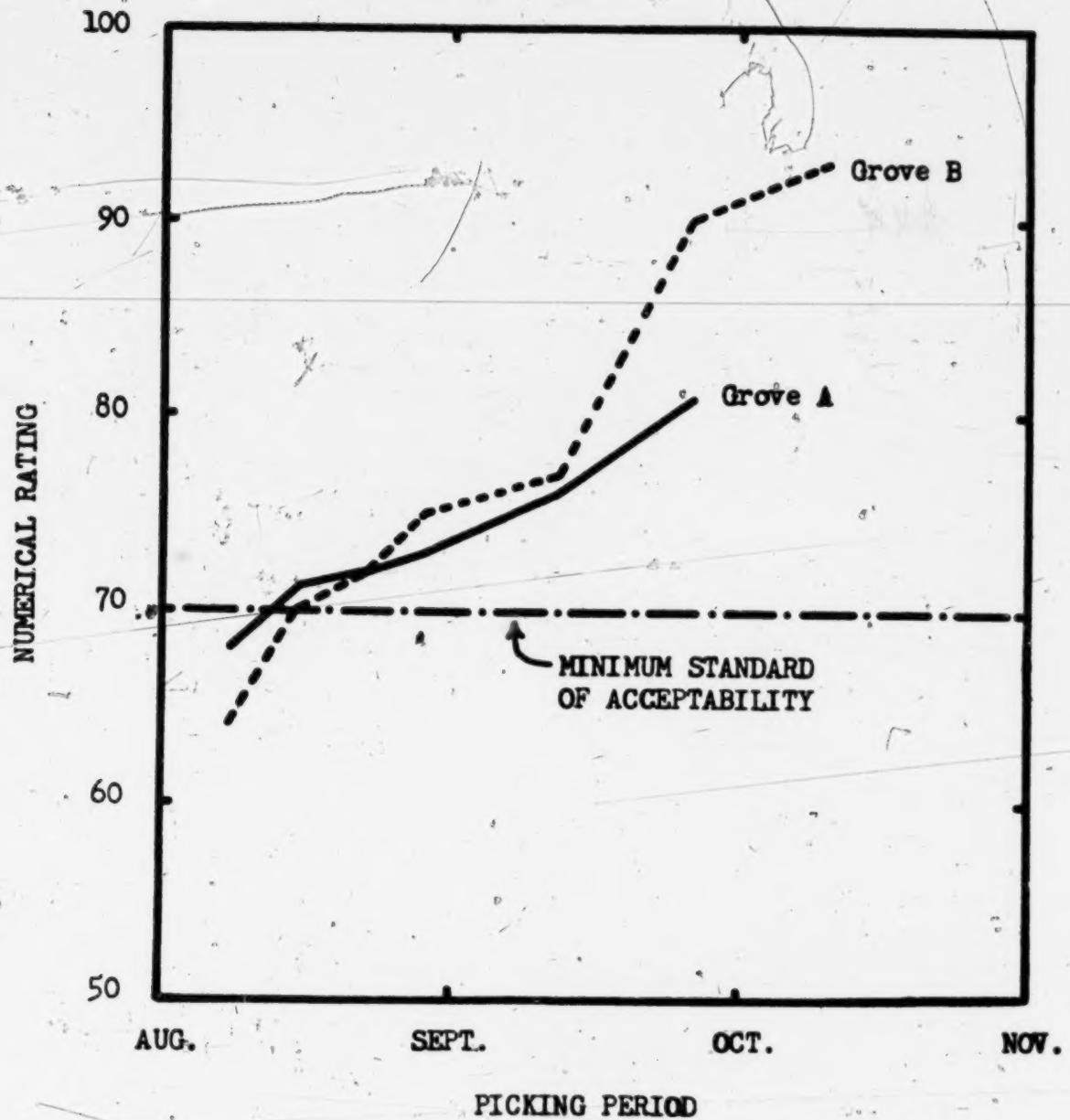


Figure 2.--Effect of crop or grove variation on the palatability of Waldin avocados, 1953.

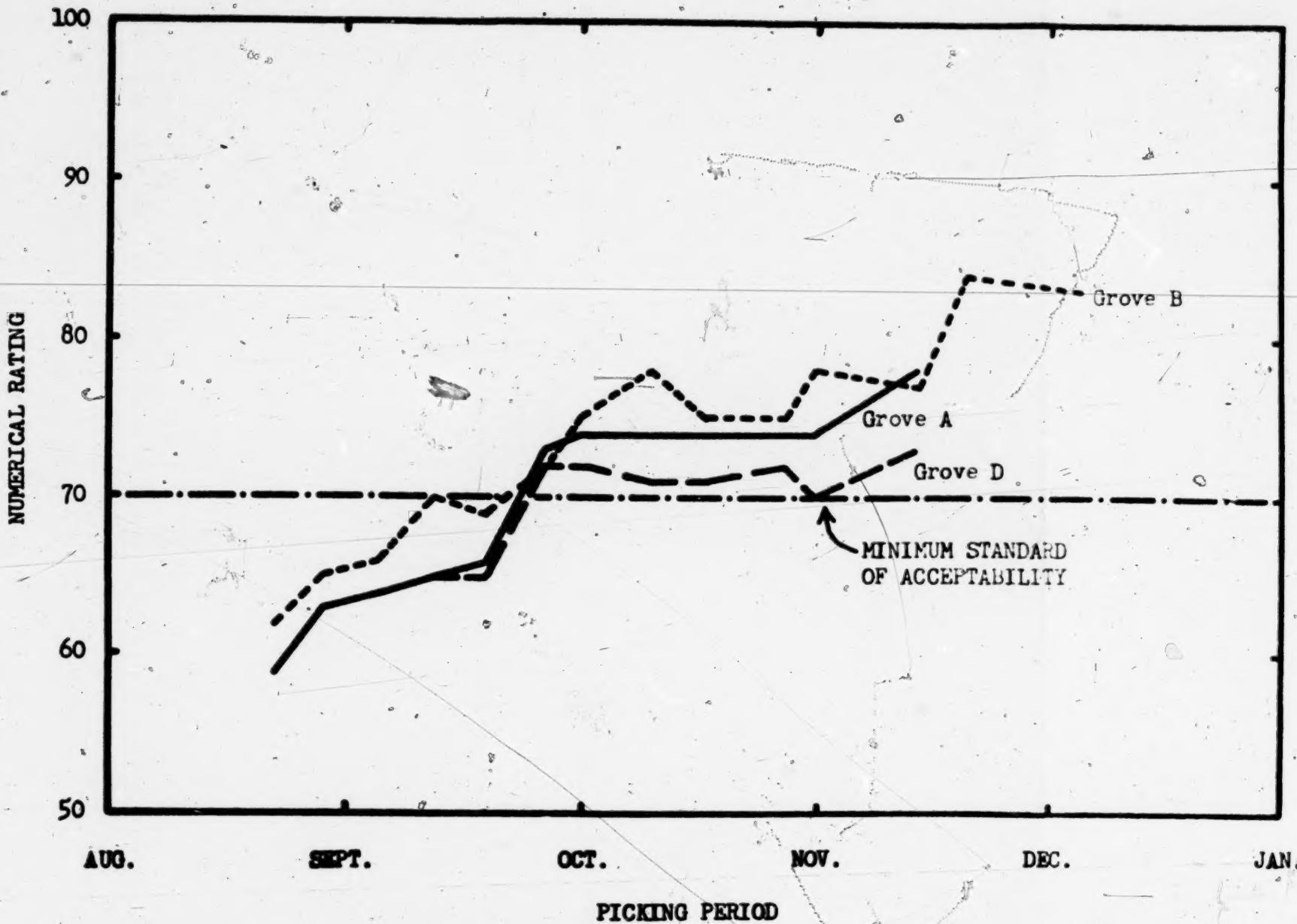


Figure 3.--Effect of crop or grove variation on the palatability of Booth 8 avocados, 1953-54.

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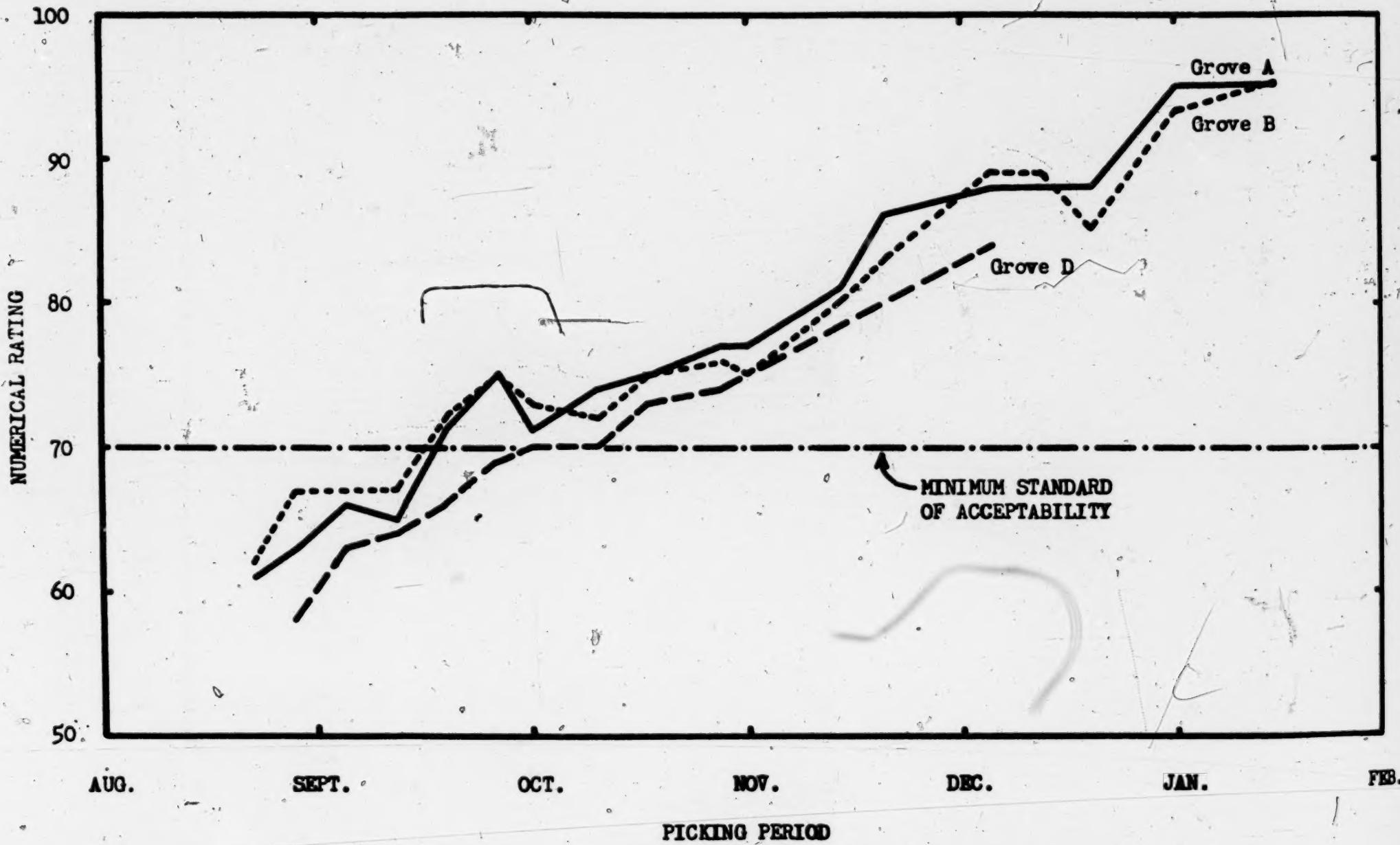


Figure 4.--Effect of crop or grove variation on the palatability of Lula avocados, 1953-54.

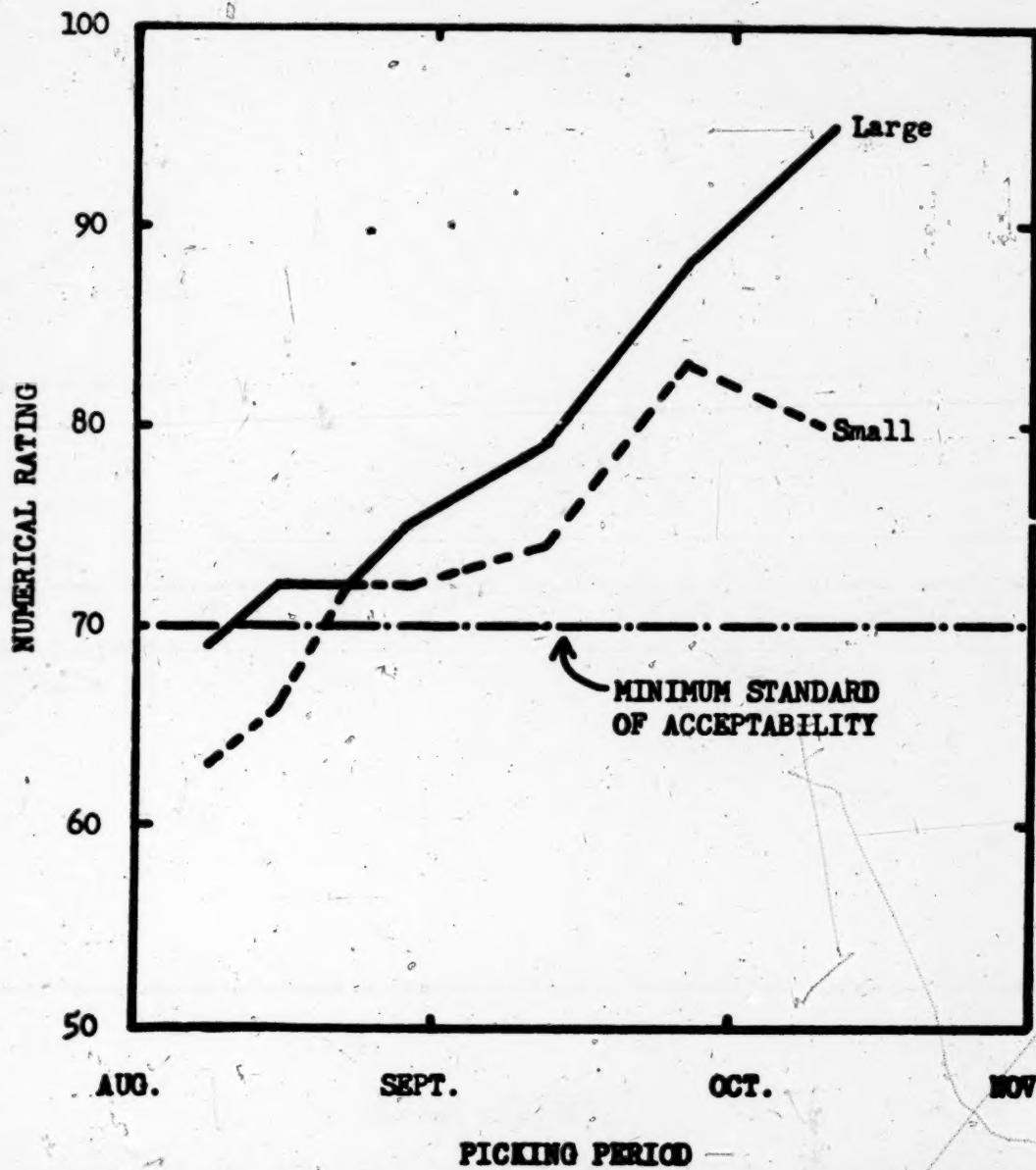


Figure 5.--Large (1 $\frac{1}{4}$ to 2 $\frac{1}{2}$ ounces) and small (9 to 17 ounces) Wal-din avocados and palatability at different picking periods. Results based on averages of 3 crops of fruit, 1953.

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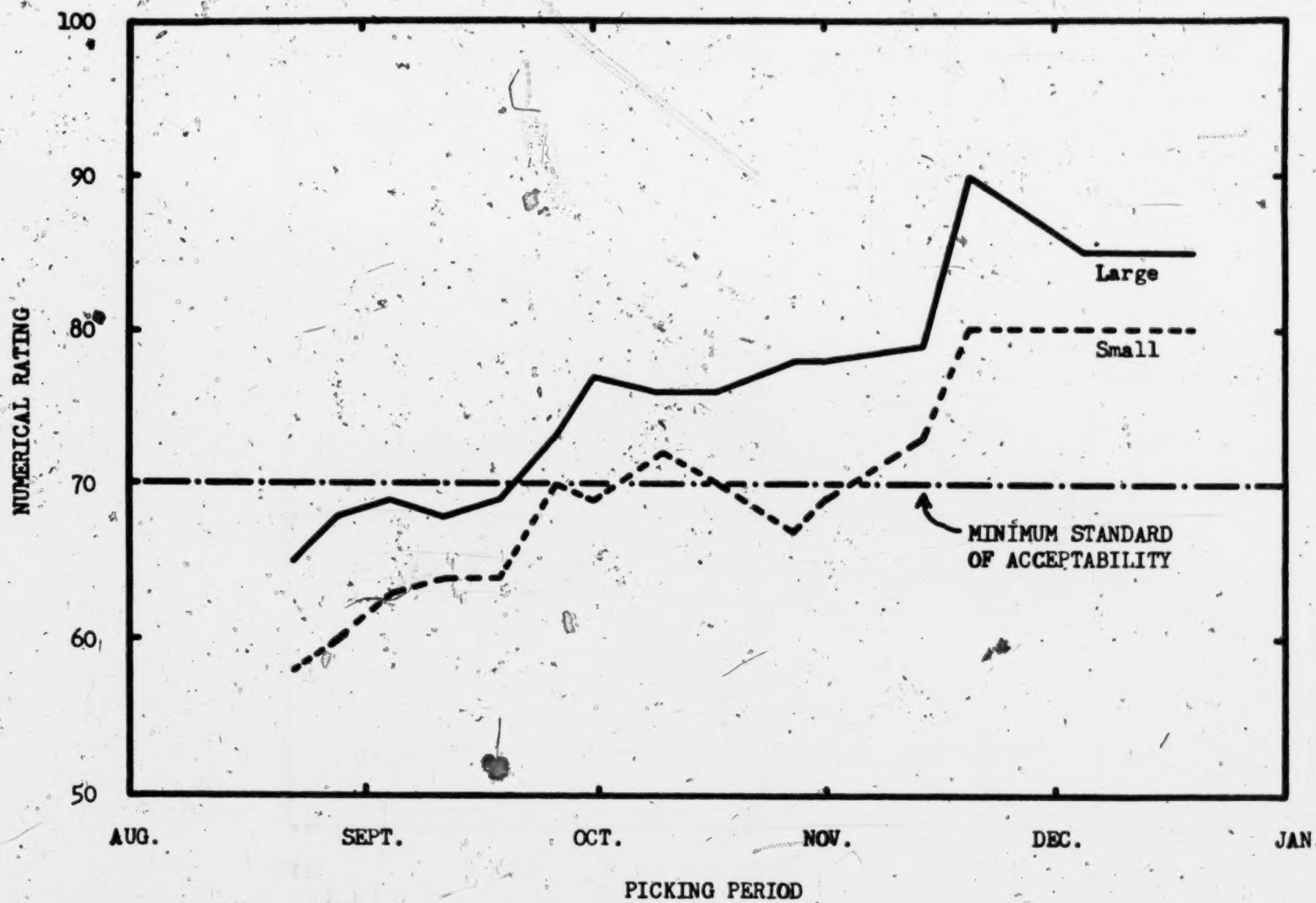


Figure 6.--Large (11 to 18 ounces) and small (6 to 10 ounces) Booth 8 avocados and palatability at different picking periods. Results based on averages of 3 crops of fruit, 1953-54.

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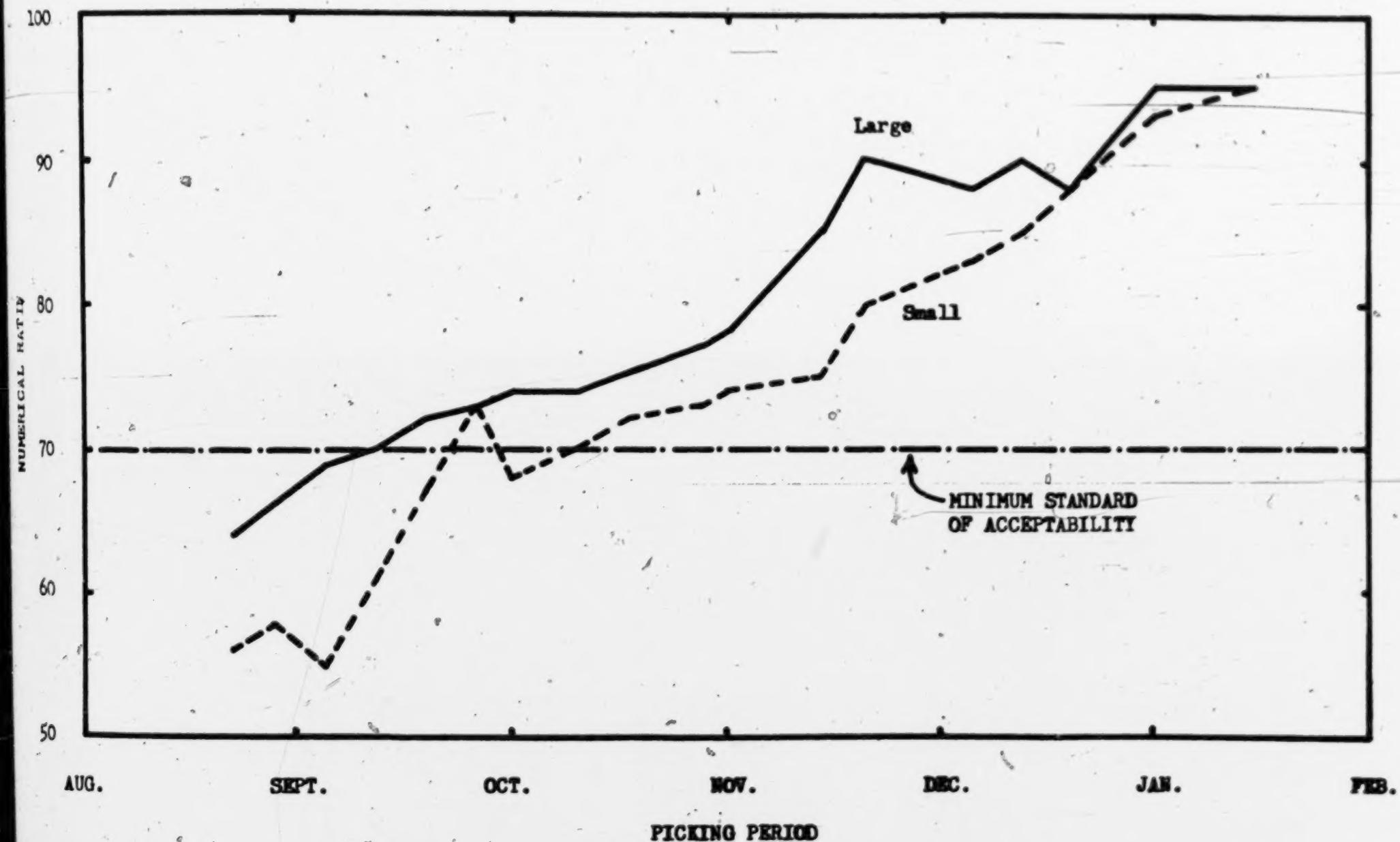


Figure 7.--Large (13 to 23 ounces) and small (9 to 15 ounces) Lula avocados and palatability at different picking periods. Results based on averages of 3 crops of fruit, 1953-54.

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General Information on Avocado Research - 1954-55

Mortimer J. Soule, Jr. and Paul L. Harding
Agricultural Marketing Service
U. S. Department of Agriculture
Orlando, Florida

Growers

A Brooks	I Futch
B F.L.A.G.	J Ward
C Kendall	K Krome
D Boe	L Ross
E Tower	M Harkness
F Ames	N Subtropical Expt. Sta.
G Rheney	O FEC. Fert. Co.
H de Guise	P White

Samples - about 60 fruits - 30 tested for oil at Homestead
30 tested for flavor at Orlando

Pressure tests - 5/16 inch plunger on 5 Hard fruit
7/16 inch plunger on Soft fruit

Softening temperature - Days to soften at 80°F.

Holding temperature - 50°F. until all fruits softened

Flavor - Based on score card 80 of good fruit. Flavor of fruit tabulated
for weight classes.

Tasters - 10 or more staff members:

Soule, Harding, Sunday, Forest, Winston, Meckstroth, Parker,
Norman, Dudak, Welty, Selhine, Melvin.

Method of tasting - Lots divided into below and above weight class. Tasters
rated composite based on diced-up flesh samples.

Samples that did not meet consumer approval during picking period for the variety.

Variety	Experimental - 1954-55			Florida Avocado Administrative Committee Regulations for 1955-56		
	Date	Weight	Flavor	Date	Weight	
	<u>Ounces</u>	<u>Numerical Rating</u>		<u>Ounces</u>		
Nadir	7-30	13	73	6-27	12	
Collinson 1/	8-25	15	61	10-17	16	
Collinson 2/	10-11	18	72	--	--	
Hickson 1/	8-25	22	65	10-17	14	
Hickson 3/	10-11	14	74	--	--	
Nelson	9-24	18	63	10-24	16	
Nirody	9-24	18	67	9-19	18	
Vaca	9-24	15	63	10-3	16	
Simpson	9-28	16	67	7-4	16	
Booth 5	9-28	13	66	10-17	16	

1/ Boe Grove

2/ Subtropical Experiment Station Grove

3/ Rheney Grove

Varieties and Sampling - 1954-55

Variety	Groves tested	Lots tested	Fruit tested	Sampling period
Fuchs	2	5	106	6-2 to 7-9-54
Waldin	3	20	585	7-19 to 9-7-54
Nadir	1	1	15	7-30-54
Hardee	1	1	6	7-30-54
Trapp	2	2	44	7-30 to 8-24-54
Tonnage	6	14	404	8-12 to 9-24-54
Hickson	2	5	131	8-12 to 10-11-54
Booth 8	5	30	945	8-12 to 11-1-54
Lula	4	41	1254	8-12 to 12-27-54
Pinelli	1	1	30	8-24-54
Simpson	2	4	128	8-24 to 9-28-54
Fairchild	1	5	151	8-25 to 9-24-54
Nelson	1	5	134	8-25 to 9-24-54
Nirody	1	5	136	8-25 to 9-24-54
Vaca	1	5	150	8-25 to 9-24-54
Collinson	2	2	61	8-25 to 10-11-54
Booth 5	1	3	96	9-10 to 9-28-54
Ajax (Booth 7B)	3	7	212	9-10 to 11-8-54
Booth 7	5	13	388	9-13 to 12-13-54
Choquette	2	3	40	11-1 to 11-29-54

Variety	Groves tested	Lots tested	Fruit tested	Sampling period
Booth 3	2	4	120	11-1 to 11-29-54
Hall	3	6	175	11-1 to 12-6-54
Booth 1	2	6	182	11-1 to 12-13-54
Taylor	2	7	208	11-1 to 12-13-54
Eagle Rock	1	1	15	12-13-54
McDonald	1	1	13	12-13-54
Nabal	1	3	82	12-13-54 to 1-10-55
Wagner	1	3	92	12-13-54 to 1-10-55
Linda	1	2	47	12-13-54 to 1-10-55
Itzamna	1	2	20	12-27-54 to 1-10-55
Schmidt	1	2	13	12-27-54 to 1-10-55
31 varieties	62	209	5983	6-2-54 to 1-10-55

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RELATION OF MATURITY OF FLORIDA AVOCADOS TO PHYSICAL CHARACTERS

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Growers and shippers of Florida avocados have had difficulty for many years in determining the degree of maturity of fruit of the numerous varieties which are grown in the State. Persistent complaints of immature fruit and low market prices led the industry to make an avocado marketing agreement with the U. S. Department of Agriculture in 1954. About 400,000 bushels (1)² were shipped during the 1954-55 season under regulated dates of picking and minimum weights for some 40 varieties.

The present investigation was a continuation of research on maturity of avocados reported by Harding (2). The objectives were to obtain additional data on the relation of palatability of avocados to picking date and fruit weight and to obtain information on other factors that might be associated with maturing and softening of fruit, such as diameter, number of days required to soften, and loss in weight.

MATERIALS AND METHODS

Most of the avocados used in this investigation were grown in Dade County, but a few samples were obtained from groves in Highlands and Palm Beach Counties, Florida. The samples, which were shipped to Orlando by express, had a transit period of 2 or 3 days. During the 1954-55 season (June 2, 1954 to

¹/Appreciation is expressed to Charles H. Steffani, formerly Dade County agricultural agent, the Florida Avocado Administrative Committee, growers, and shippers for their generous support and for fruit used in the investigation and to Roy W. Harkness, associate chemist, Florida Sub-Tropical Experiment Station, Homestead, for his cooperation. Acknowledgment of assistance is made to W. T. Pentzer, chief, Biological Sciences Branch, Beltsville, Md., and to Earl F. Nelson and Ernest Forrest, formerly biological aids, Quality Maintenance and Improvement Section, Orlando, Florida.

²/Italic numbers in parentheses refer to Literature Cited.

Jan. 10, 1955) samples of avocados of 31 varieties from 16 groves were tested at Orlando. The varieties studied were Fuchs, Nadir, Hardee, Waldin, Trapp, Pinelli, Tonnage, Fairchild, Booth 8, Niroyd, Simpson, Vaca, Booth 5, Booth 7, Collinson, Lula, Hickson, Nelson, Ajax (Booth 7 B), Booth 3, Hall, Taylor, Booth 1, Linda, Wagner, Choquette, Nabal, Eagle Rock, Itzamna, McDonald and Schmidt.³

The samples were composed of about 30 fruit of each variety. Fruit were picked at random and were of a wide range in sizes. Most varieties were tested over a fairly long period by sampling at intervals of 7 to 10 days.

On arrival at Orlando each fruit was numbered, weighed and calipered. Five hard fruit of each sample were tested immediately. The remainder of the sample was stored at 80° F. for softening. Daily inspection of individual fruit was made. When it attained the desired degree of softness, each fruit was removed to 50° F. until the entire sample had softened. The tests included weight, diameter, number of days required to soften at 80° F. and flavor of the softened avocados. Fruit which tasted poor was considered green and immature while that which tasted good was considered mature. Fruit of the good category were smooth, mellow, tasty, rich, and nutty with a buttery texture. Each sample was rated on its own merit and no attempt was made to compare palatability ratings of different varieties.

RESULTS AND DISCUSSION

The findings herein are for a single season and should be regarded as tentative. However, the results for most of the varieties were in substantial agreement with the data previously reported by Harding (2).

Summer Varieties:—Earliest picking dates, minimum weights, number of days required for softening at 80° F., and loss in weight of summer varieties of avocados which met consumer approval are shown in Table 1. Good

³/Varieties are listed in the order given by Florida Avocado Administrative Committee bulletins.

quality was attained by 16-ounce fruit of Fuchs on July 9, 17-ounce fruit of Hardee on July 30, 15-ounce fruit of Trapp on July 30, 31-ounce fruit of Pinelli on Aug. 24, and 13-ounce fruit of Waldin on Aug. 2 or Aug. 9. The number of days required for softening at 80° F. ranged from 2 to 7. Loss in weight during softening varied from 5 to 7 percent. There was apparently little connection between flavor and number of days required for softening or loss in weight.

Fall Varieties:—Earliest picking dates, minimum weights, minimum diameters, number of days required for softening at 80° F., and loss in weight of fall varieties of avocados which met consumer approval are presented in Table 2. In most instances, the minimum weight for fruit of good quality decreased steadily as the season of picking for a variety progressed. There were, however, variations in the earliest picking dates for fruit of the same weight picked from different groves. For example, 19-ounce Lula fruit from grove A were of good quality on Nov. 1 and from grove C on Oct. 11. Fruit of given weight and variety had a rather narrow range in diameter which remained constant over the entire period of picking. Palatability of fruit at any date of picking was associated with a

minimum weight and a corresponding minimum diameter. For example, Booth 7 fruit weighing 11 ounces had a minimum diameter of 3.4 inches on Nov. 15, Dec. 6 and Dec. 13. The number of days required for softening at 80° F. ranged from 1 to 6. Loss in weight varied from less than 2 to 8 percent. There seemed to be little connection between flavor and physical characters other than picking date, weight or diameter.

Winter Varieties:—Earliest dates of picking, minimum weights, minimum diameters, number of days required for softening at 80° F., and loss in weight of winter varieties of avocados which met consumer approval are given in Table 3. Good quality was attained by 23-ounce Linda fruit on Dec. 13, 10-ounce Wagner fruit on Jan. 10, 33-ounce Choquette fruit on Nov. 15, 16-ounce Naba fruit on Dec. 13, and 22-ounce Eagle Rock fruit on Dec. 13. Minimum diameter for consumer approval ranged from 3.1 inches for 10-ounce fruit of Wagner and Naba to 4.6 inches for 33-ounce fruit of Choquette. The number of days required for softening varied from 4 to 6. Loss in weight during softening was from 3 to 5 percent.

Progress of Maturity in Fruit of Similar Weight:—When samples of any variety were

Table 1. Earliest picking date, minimum weight, number of days required for softening at 80° F. and loss in weight of summer varieties of Florida avocados which met consumer approval in tests at Orlando, 1954-55.

Variety	Grove	Picking period	Earliest picking date for minimum maturity	Minimum fruit weight	Softening period		Loss in weight 80° F.
					Ounces	Days	
Fuchs	A	June 14-July 9	July 9	16	2	5	
Hardee	K	July 30	July 30	17	2	6	
Trapp	K	July 30	July 30	15	4	5	
Pinelli	P	Aug. 24	Aug. 24	31	6	7	
Waldin	C	Aug. 2-Sept. 7	Aug. 9	13	7	6	
	F	Aug. 2-Sept. 7	Aug. 2	13	5	7	
			Aug. 9	17	6	6	
	G	July 19-Sept. 7	Aug. 9	13	5	6	

Samples of Nadir did not meet consumer approval during the picking period for the variety.

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divided into subsamples according to predetermined weight classes, large fruit received a higher flavor rating than small fruit after softening. This trend remained fairly consistent throughout the picking period of a variety. Data for Lula are presented in Figure 1.

Table 2. Earliest picking date, minimum weight, minimum diameter, number of days required for softening at 80° F., and loss in weight of fall varieties of Florida avocados which met consumer approval in tests at Orlando, 1954-55.

Variety ^{1/}	Grove	Picking period	Earliest picking date for minimum maturity		Minimum fruit weight	Minimum fruit diameter	Softening period at 80° F.	Loss in weight
			1954-55	1955-55				
Tchahar	K	Aug. 25-Sept. 21	Sept. 17	16	—	—	5	6
Fairchild	K	Aug. 25-Sept. 21	Sept. 3	21	—	—	3	4
			Sept. 17	24	—	—	1	3
Booth 5	A	Aug. 23-Oct. 11	Oct. 11	13	3.2	—	—	—
	C	Aug. 16-Nov. 1	Oct. 11	13	3.2	—	—	—
			Nov. 1	10	2.4	—	5	—
Booth 7	C	Sept. 20	Sept. 20	21	4.3	—	—	—
	G	Sept. 13-Dec. 13	Nov. 20	11	3.4	—	4	6
			Dec. 6	11	3.4	—	5	7
			Dec. 13	11	3.4	—	5	8
	M	Nov. 29-Dec. 6	Nov. 29	10	3.0	—	5	9
	N	Nov. 15	Dec. 6	8	2.9	—	5	9
	N	Nov. 15	Nov. 15	12	3.3	—	4	—
Lula	A	Aug. 23-Dec. 27	Nov. 1	19	3.9	—	—	—
	C	Aug. 23-Dec. 27	Nov. 8	13	3.2	—	5	5
			Oct. 11	19	3.7	—	5	5
			Nov. 1	16	3.5	—	5	5
			Nov. 15	21	3.4	—	5	4
			Nov. 29	13	3.3	—	5	4
Ajax(Booth 7B)	A	Nov. 1-Nov. 6	Nov. 1	13	3.5	—	6	4
Booth 3	B	Nov. 6-Nov. 29	Nov. 29	16	3.7	—	6	4
	G	Nov. 1-Nov. 6	Nov. 1	19	3.9	—	5	5
Hall	B	Nov. 1-Nov. 15	Nov. 1	22	3.8	—	5	5
			Nov. 8	17	3.5	—	5	4
			Nov. 15	14	3.3	—	5	4
	G	Nov. 1	Nov. 1	28	4.1	—	5	5
	M	Nov. 29-Dec. 6	Nov. 29	24	3.3	—	6	4
Taylor	G	Nov. 1-Dec. 13	Nov. 29	13	3.2	—	5	3
Booth 1	B	Nov. 1-Nov. 29	Nov. 15	16	3.7	—	5	5
	G	Nov. 1-Dec. 13	Nov. 29	16	3.8	—	5	3
			Dec. 13	13	3.4	—	6	4

^{1/} Samples of Nirody, Simpson, Vaca, Booth 5, Collinson, Hickson, and Nelson did not meet consumer approval during the picking period for the variety.

^{2/} Less than 2 percent.

Table 3. Earliest picking date, minimum weight, minimum diameter, number of days required for softening at 80° F., and loss in weight of winter varieties of Florida Avocados which met consumer approval in tests at Orlando, 1954-55.

Variety 1/	Grove	Picking period	Earliest	Minimum	Minimum	Softening	Loss in
			picking date for	fruit weight	fruit diameter	period at 80° F.	weight
			minimum maturity				
			1954-55	1954-55	Ounces	Inches	Days
Linda	N	Dec. 13-Jan. 10	Dec. 13 Jan. 10	23 19	.3.8 3.7	4 5	4 4
Ma'ner	N	Dec. 13-Jan. 10	Jan. 10	10	3.1	6	4
Choquette	B	Nov. 1-Nov. 15	Nov. 15	33	4.6	4	3
	N	Nov. 29	Nov. 29	29	4.1	5	4
Nabel	N	Dec. 13-Jan. 10	Dec. 13 Dec. 27 Jan. 10	16 11 10	3.6 3.2 3.1	5 6 6	3 4 5
Eagle Rock	N	Dec. 13	Dec. 13	22	3.7	6	4

1/ Samples of Itzanna, McDonald, and Schmidt did not meet consumer approval during the picking period for the variety.

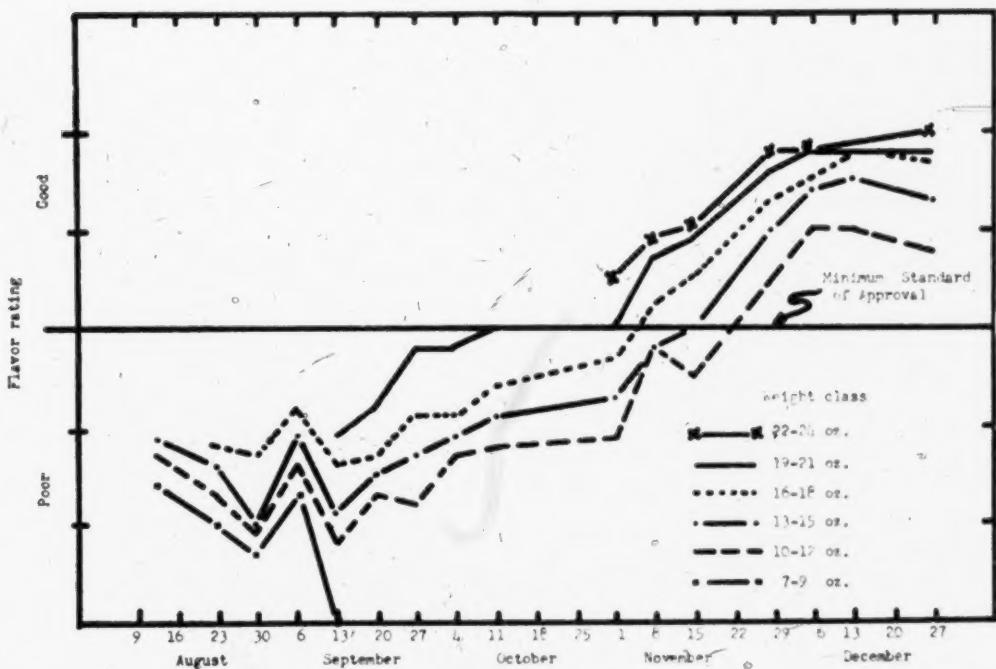


Figure 1. Relation of average flavor ratings of Lula avocados in various weight classes to picking dates, 1954. Each average is based on fruit from 2 or 3 groves.

Booth 1 avocados were subjected to a series of regression analyses in which individual factors, such as picking date (expressed as weeks after the first picking), fruit weight, fruit diameter, ratio of weight to diameter, percentage loss in weight, number of days required for softening at 80° F., weight of hard fruit tested immediately on arrival at Orlando and diameter of hard fruit, were tested singly and in combinations of 2 or 3 against flavor rating. Representative analyses for Lula variety are listed in Table 4. It will be noted that analyses in which picking date was included as one of the independent variables always gave very large correlation coefficients. Fruit

weight or fruit diameter used as independent variables in simple regression analyses gave lower correlation coefficients but still too large to be the result of chance variations in sampling. The multiple correlation coefficient with flavor rating resulting when three independent variables, picking date, fruit weight, and fruit diameter, were used was essentially identical to the multiple correlation with numerical taste rating when two independent variables, picking date and the ratio of fruit weight to fruit diameter, were used. Percentage loss in weight and number of days required for softening, individually or in combination, were poorly related to numerical taste rating so are not

Table 4. Correlation coefficients, standard errors of regression, and regression equations for analyses of various independent factors with taste ratings of Lula avocados, 1954-55.

Analysis number 1/	Independent variable	Correlation coefficient (r or R) 2/	Standard error of regression (s _{y,x}) 3/	Regression equation 4/
1	Picking date (X)	r = .9807**	2.72	$\bar{Y} = 2.57X + 59.30$
2	Fruit weight (X)	r = .940**	4.78	$\bar{Y} = 6.93X - 63.56$
3	Fruit diameter (X)	r = .9264**	5.22	$\bar{Y} = 123.24 - 354.36$
4	Picking date (X ₁); fruit weight (X ₂)	R = .9864** y ₁₂	2.40	$\bar{Y} = 1.94X_1 + 2.18X_2 + 24.44$
5	Picking date (X ₁); fruit diameter (X ₂)	R = .9832** y ₁₂	2.67	$\bar{Y} = 2.14X_1 + 23.50X_2 - 20.22$
6	Picking date (X ₁); ratio fruit weight/diameter (X ₂)	R = .9905** y ₁₂	2.05	$\bar{Y} = 1.80X_1 + 15.75X_2 - 6.13$
7	Picking date (X ₁); fruit diameter (X ₂); fruit weight (X ₃)	R = .9900** y ₁₂₃	2.15	$\bar{Y} = 2.06X_1 - 80.35X_2 + 7.79X_3 + 221.47$

1/ In each case the dependent variable (Y) was flavor rating and the number of items (n) = 12.

2/ Significant values of r with (n-2) degrees of freedom at odds of 99 to 1 and 19 to 1 are .706 and .576, those for R with (n-3) degrees of freedom .735 and .602 and for R with (n-4) degrees of freedom .765 and .602.

3/ Variation in dependent variable (Y) not explained by changes in the independent variable (X).

4/ \bar{Y} signifies the predicted or expected value of Y.

5/ Expressed as weeks after first picking; Sept. 13 = 1.

given in Table 4. Weight or diameter of hard fruit gave lower correlations with numerical taste rating than the respective measurements for soft fruit. Similar results were obtained with other varieties.

The values in Table 4 for Lula avocados indicate that tests for maturity and palatability of fruit would gain slightly in precision by the addition of fruit diameter to picking date and fruit weight as independent variables. There appeared to be a straight-line relation between picking date, fruit weight and fruit diameter and flavor rating from immaturity to post-maturity.

SUMMARY

During the 1954-55 season, 209 different samples of avocado fruits of 31 varieties from 16 groves were tested for maturity and quality. Earliest picking dates, minimum weights, minimum diameters, number of days required for softening at 80° F., and loss in weight of summer, fall and winter varieties of avocados which met consumer approval were determined. Variations in the minimum weight of fruit of good quality picked from different groves on the same date or of the same weight but picked on different dates were noted for

a number of varieties. Fruit diameter of fall varieties ranged from 2.9 inches for 8-ounce fruit to 4.3 inches for 24-ounce fruit of Booth 7 and of winter varieties from 3.1 inches for 10-ounce fruit of Wagner and Nabal to 4.6 inches for 33-ounce fruit of Choquette. The number of days required for softening at 80° F. varied from 1 to 7. Loss in weight during softening ranged from less than 2 to 8 percent. Large fruit of a variety were rated higher than small fruit and this trend remained fairly constant throughout the picking season. There appeared to be a straight-line relationship between picking date, fruit weight and fruit diameter and flavor rating from immaturity to post-maturity for Lula, Booth 8, Booth 7, Hickson, Taylor and Booth 1 varieties. Percentage loss in weight and number of days required for softening were poorly related to flavor.

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PLAINTIFFS' EXHIBIT 25

General Information on Avocado Research, 1955-56.

RELATION OF MATURITY TO CERTAIN CHEMICAL AND PHYSICAL CHARACTERS IN FLORIDA AVOCADOS

Thurman T. Hatton, Jr., John Popenoe,
Mortimer J. Soule, Jr., and Paul L. Harding
Agricultural Marketing Service
U. S. Department of Agriculture
Miami and Orlando, Florida

Growers:	Ames	Kent
	Kendall	Rowe
	Krome	Futch
	Rheney	Kinard
	Brooks	White
	Watts	

Samples: About 60 fruits - 30 tested for chemical constituents at Miami
30 tested for flavor at Orlando

All varieties sampled at weekly intervals. All fruit from the same trees, using 15 fruits per lot. Each lot was composited for the test.

Pressure tests - 7/16 inch plunger on soft fruit.

Softening temperature - Days to soften at 80°F.

Holding temperature - 50°F.

Flavor - based on good fruit (score card 80).

Tasters - Soule, Harding, Sunday, Budak, Melty, Parker, Meckstroth, Melvin, Henry, Williams, Cubbedge.

Confidential - Not to be quoted or copied.

Method of tasting - Flavor ratings made on large and small fruits.
Numerical ratings based on composite (puree) sample.

Variety	Groves Tested	Lots Tested	Fruit Tested	Sampling Period
Fuchs	1	8	120	6-27 to 7-18-55
Pollocks	1	8	120	6-27 to 7-18-55
Simmonds	1	12	180	6-27 to 8-1-55
Petersen	1	8	120	7-25 to 8-15-55
Pinelli	1	6	90	8-1 to 8-15-55
Trapp	1	6	90	8-1 to 8-15-55
Waldin	1	12	180	8-1 to 9-6-55
Booth 8	1	12	180	8-29 to 10-3-55
Booth 7	1	12	180	9-19 to 10-24-55
Lula	1	12	180	9-26 to 10-31-55
Hickson	1	12	180	9-26 to 10-31-55
Monroe	1	12	180	10-10 to 11-14-55
Booth 1	1	12	180	10-31 to 12-6-55
Taylor	1	12	180	11-1 to 12-5-55
14 varieties	14	144	2160	6-27 to 12-6-55

Fruit determinations: Weight, diameter, length, pressure of flesh, percent oil, total solids, percent glucose, phenolics

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FLORIDA STATE HORTICULTURAL SOCIETY
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RELATION OF MATURITY TO CERTAIN CHEMICAL AND PHYSICAL CHARACTERS IN FLORIDA AVOCADOS

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MORTIMER J. SOULE, JR.,¹ PAUL L. HARDING
U.S. Department of Agriculture, Agricultural
Marketing Service, Quality Maintenance
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Miami and Orlando, Florida

The Florida avocado industry is interested in finding more accurate measures of avocado maturity. The objective of the present investigation was to obtain data on physical and chemical characters of Florida avocados which might indicate their maturity. Special consideration was given to the beginning picking dates and the minimum fruit weights specified in the Florida avocado marketing agreement. This work was a continuation of avocado maturity studies reported by Harding (4) and Soule and Harding (9).

MATERIALS AND METHODS

During the 1955-56 season, the following varieties were studied: Fuchs, Pollock, Simmonds, Petersen, Pinelli, Trapp, Waldin, Booth 8, Booth 7, Lula, Hickson, Monroe, Booth 1, and Taylor. Except for the fruit of the Taylor variety, which was obtained from Highlands County, all fruit came from Dade County.

Where possible the first fruit of each variety were picked 3 weeks in advance of the earliest picking date specified in the market-

ing agreement (2). Test fruit were obtained and analyzed weekly. Each weekly sample consisted of 60 fruit per variety, 30 of which weighed below the minimum set by the marketing agreement and 30 of which met or exceeded the minimum weight requirement. The sub-samples were equally divided, half being sent to Orlando and half being retained at Homestead. Fruit shipped to Orlando were allowed to soften in an 80° F. storage chamber and tests were performed on soft fruit. The Homestead studies were conducted on hard fruit.

Tests for oil content of the fresh fruit were made by the standard California method (8) modified by Harkness (5). Tests for reducing sugars and phenolic compounds were made a few months later on portions of frozen samples of hard fruit which had been stored at -15° to -40° F. The method of determining phenolic compounds was that employed by Guadagni *et al* (3) and that for reducing sugars was one adopted by Sumner (11); both were colorimetric procedures.

In addition, the following tests and measurements were made on the fruit: weight, length, diameter, total soluble solids, firmness of flesh, days to soften at 80° F., loss in weight to ripening, amount of decay and flavor ratings. Flavor was rated by ten members of the Orlando staff on the basis of the characteristics described by Harding (4). The 15 fruit from each group were blended for all chemical tests. Taste tests were made on the blend. No attempt was made to compare palatability ratings of different varieties.

¹ Associate Professor, Fruit Crops Department, University of Florida, Gainesville, Fla., formerly of this section.

RESULTS AND DISCUSSION

It was impossible to pick the first fruit of every variety 3 weeks in advance of the earliest picking date specified by the marketing agreement because fruit of some varieties large enough to make up the heavier of the two weight groups could not be found. For example, fruit of Fuchs and Trapp weighing 14 ounces, the minimum regulated weight for these varieties, could not be found in the Dade County area at the beginning picking date. At the beginning picking date it was difficult to find Waldin avocados that had reached the minimum specified weight. This difficulty was more prevalent with the summer or West Indian varieties than with the fall or winter ones.

Data for only the three most important commercial varieties, Lula, Booth 8 and Waldin, are presented in table 1. Results for these varieties were similar to those for other varieties. These data were taken before, on and after the beginning picking date in the regulations.

There was no change in the amount of total soluble solids in fruit picked before and after the picking date in the regulations. In some varieties, a statistical "t" test showed that fruit below the minimum weight had significantly less total soluble solids than those above the minimum weight. Although the Booth 8 variety had this significant difference in total soluble solids, no statistical correlation existed between taste and total soluble solids.

The percentage of phenolic compounds in the fruit also did not change consistently with the advance of the season. No statistical correlation existed between the percentage of phenolic compounds in the fruit and the flavor rating of the fruit.

No trend occurred in the percentage of reducing sugars with the advance of season for the approximately six weeks in which the fruit was sampled; however, Church and Chace (1), working with California avocados, and Stahl (10), working with Florida avocados, found that as the season advanced and the fruit became more mature, the percentage of

Table 1.—Soluble solids, phenolic compounds, reducing sugars, oil and flavor of some Florida avocados^{1/} above and below the minimum weight^{2/} and before, on and after picking dates as specified in the regulations, 1955.

Variety and picking date	Total solids in fruit		Phenolic com- pounds in fruit		Reducing sugars in fruit		Oil in fruit		Flavor rating ^{3/} of fruit	
	Below minimum	Above minimum	Below minimum	Above minimum	Below minimum	Above minimum	Below minimum	Above minimum	Below minimum	Above minimum
	%	%	%	%	%	%	%	%	%	%
Waldin ^{4/}										
Aug. 15	9.3	9.6	1.6	1.5	3.5	3.3	1.9	2.3	65	73
8	9.0	8.9	5.8	5.3	3.5	3.4	1.9	2.6	70	79
15	9.2	9.2	5.7	5.6	3.7	3.7	3.3	3.6	75	85
22	9.1	9.9	4.5	4.7	3.9	4.0	3.3	3.3	70	70
29	9.7	9.7	5.7	4.5	4.2	3.3	4.2	4.2	78	85
Sept. 6	9.7	9.6	4.5	4.5	3.3	3.9	3.9	3.9	81	86
Booth 8:										
Aug. 29	8.3	8.3	8.5	7.7	3.2	3.6	4.2	4.2	60	60
Sept. 6	8.0	8.6	5.0	4.5	2.7	1.5	5.6	5.6	71	75
12	7.9	9.2	6.3	5.8	2.5	3.2	4.8	4.6	76	79
19 ^{5/}	7.7	8.6	7.3	6.5	3.0	2.9	4.9	4.9	76	80
26	8.2	8.6	6.7	8.2	2.8	2.9	6.7	5.3	75	75
Oct. 3	8.1	8.6	8.5	7.0	2.5	3.1	5.2	5.2	76	77
Lula:										
Sept. 26	9.5	9.9	6.3	6.5	4.1	4.6	4.3	5.3	76	76
Oct. 3	9.7	9.9	7.7	7.0	4.1	4.4	5.7	6.9	73	75
10	9.9	7.9	7.0	7.0	4.5	4.5	5.5	5.1	75	77
17 ^{6/}	10.9	10.9	7.8	7.3	5.0	4.8	4.8	5.6	72	75
24	9.9	10.2	7.0	7.0	4.8	4.5	5.1	5.0	76	76
31	8.2	8.7	7.7	8.5	5.0	4.6	5.2	6.4	74	76

^{1/} Flavor ratings were made on a blend of 15 soft avocados and other determinations on a blend of 15 hard ones.

^{2/} Values in the "below minimum" columns represent samples selected below the minimum fruit weight in the regulations; values in the "above minimum" columns represent samples selected above the minimum fruit weight in the regulations.

^{3/} Ratings below 70 indicate fruit that failed to pass the flavor test, 70-79 palatable fruit, and 80-100 excellent fruit.

^{4/} On or about the official beginning-picking date on the basis of the 1955-56 regulations. The special weight and date for the Lula variety in the 1955-57 regulations were not used in this study.

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total sugars decreased. No difference could be found in the percentage of reducing sugars in fruit below and above the minimum weight. There was no statistical correlation between the percentage of reducing sugars and the flavor rating of the fruit.

There were few changes in percentage of oil from week to week and no significant difference in the percentage of oil in fruit picked before the beginning picking date and those picked after the beginning picking date for the period in which this study was undertaken. However, it has long been known that as avocado fruit attain greater maturity they increase in percentage of oil (1, 10). Hatton *et al* (6) showed that selecting Florida avocados for a specific percentage of oil was not practical because of the wide variation in percentages of oil in individual fruit at any given time. In this study there was also no significant difference in the oil content of fruit below the minimum fruit weight and above it. The data indicate that there is no statistical correlation between the percentage of oil and flavor rating of Florida avocados during the first few weeks of the harvest season. However, Hodgkin (7) found a direct relation between percentage of oil and flavor of California avocados.

Fruit above the minimum weight in the regulations had a higher flavor rating than those below it, but correlation of weight and flavor has already been shown by Soule and Harding (9).

In all of the tests described, there were no significant differences between soft and hard fruit. Other physical tests are not shown

herein since they agree with previous findings (4, 5, 10).

With data accumulated to date, the present maturity regulations of beginning picking dates and minimum picking weights or diameters are the most satisfactory indices for Florida avocados.

SUMMARY

Samples of 14 varieties of avocados were selected below and above the minimum fruit weight and picking date on the basis of the 1955-56 Florida avocado maturity regulations. Analyses for oil content, reducing sugars, total soluble solids and phenolic compounds showed no appreciable changes for the period in which the samples were studied. The findings indicate that present maturity regulations are still the most satisfactory for Florida avocados.

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PLAINTIFFS' EXHIBIT 26

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RESUMÉ OF PROGRESS OF STUDIES ON
FLORIDA AVOCADO MATURITY

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Miami, Florida

Maturity specifications for the shipment of Florida avocados are based on minimum fruit weights or diameters, and initial release dates for each variety. These specifications permit the larger sizes of each variety to be shipped at designated dates before size restrictions are completely removed on a final release date.

During 1958-59, 1959-60, and 1960-61 approximately 3,500 individual avocados were analyzed for oil content and measured for weight and diameter. These studies included 37 different varieties. Pollock, Waldin, Booth 8, Lula, Taylor, and Booth 1, which are among the principal varieties, were studied during all 3 seasons. The other varieties were studied only during 1959-60.

Biweekly sampling started well in advance of the initial release date and continued until the final release date, which covered a period of about 3 months. The varieties studied during the 1959-60 season were sampled on the beginning and final release dates only. In all cases comparable fruit were allowed to soften at 70° F. to determine palatability. Fruit above minimum consumer acceptability with smooth, mellow, rich, and nutty taste was rated "good."

In general, over the 3-year period, the initial release dates and the date at which the fruit was at minimum consumer acceptability or above were in agreement. Extreme conditions, such as the freeze which occurred in the 1958-59 season, delayed the maturity of the fruit.

fol. 439] West Indian varieties of avocados have low oil content. Pollock, for example, rated "good" and averaged less than 3 percent oil. They ranged from 1.5 to 7.0 percent oil when first rated "good". Hybrid avocados varied with variety as to oil content. The Lula contained 6 percent or less oil when rated "good." Booth 1 contained as much as 10 percent oil when rated "good". Taylor, a Guatemalan variety, averaged about 6 percent oil when rated "good". At any given picking date, there is a wide range in the oil content for each variety for each weight class. For example, Pollock ranged from 2.1 to 4.5 percent, and Booth 1 ranged from 6.0 to 14.0 percent.

Palatability improved and oil content increased as the season progressed, however, for each variety, no consistent relationship appeared to exist between oil content and consumer acceptability at any given date. For most varieties, on initial release dates the fruit of larger weight and diameter appeared to have higher consumer acceptability. Later in the season the divergence seemed to diminish. Present methods of establishing maturity standards on the basis of weights or diameters at specified picking dates are reasonably satisfactory. Standards based on oil content are not practical for Florida avocados because of the high degree of variation between varieties, among individual fruits of a variety, and the year-to-year variation.

[fol. 440]

DEFENDANTS' EXHIBIT E

FLORIDA AVOCADOS

1955-1956
ANNUAL REPORT

Variety	Bushels	% of Total Reported
Lula	124237	24.07
Booth 8	85494	16.56
Booth 7 or 7B	68613	13.29
Waldin	50259	9.73
Booth 1	28921	5.60
Pollock and Simmonds	24059	4.66
Hickson	18425	3.57
Booth 3	17093	3.31
Seedlings	16391	3.17
Taylor	15344	2.97
Trapp	13028	2.52
Collinson	11635	2.25
Fuchs	11581	2.24
Tonnage	4514	.87
Monroe	3801	.73
Wagner	3487	.67
Choquette	2368	.45
Linda	2117	.40
Booth 5	1808	.35
Hall	1551	.30
Simpson	1093	.21
Herman	972	.18
Pinelli	906	.18
(Includes 23 varieties and seedlings)	507697	98.28%
		of Total Amount Received by Handlers.

516103 Total Reported Bushels

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FLORIDA AVOCADOS

1956-1957
ANNUAL REPORT

Variety	Bushels	% of Total Reported Crop
Lala	145229	33.07
Booth 8	55344	12.59
Booth 7 and 7B	39633	9.01
Waldin	38148	8.68
Taylor	25277	5.75
Collinson	18332	4.17
Booth 1	18298	4.16
Hickson	16485	3.75
Pollock and Simmonds	14959	3.40
Seedlings	13124	2.98
Booth 3	11814	2.68
Trapp	10547	2.40
Tonnage	4509	1.02
Fuchs	3798	.86
Monroe	2344	.76
Hall	3193	.72
Linda	2699	.61
Wagner	2439	.55
Choquette	1852	.42
Herman	863	.19
Booth 5	688	.15
Pinelli	200	.05
Includes 22 varieties and seedlings)		430875
		97.97%
		of Total Amount Received by Handlers.

4419 Total Reported Bushels.

[fol. 442]

FLORIDA AVOCADOS

1957-1958
ANNUAL REPORT

Variety	Bushels	% of Total Reported
Lula	158752	27.00
Booth 8	129348	22.00
Waldin	60261	10.25
Booth 7 and 7B	54345	9.24
Booth 1	38630	6.57
Hickson	18683	3.17
Pollock and Simmonds	18545	3.15
Seedlings	18211	3.09
Trapp	10763	1.83
Booth 3	8984	1.52
Taylor	8350	1.42
Fuchs	8068	1.37
Collinson	5343	.90
Hall	4517	.76
Booth 5	4481	.76
Choquette	3345	.56
Wagner	2787	.47
Herman	1406	.23
Linda	1154	.19
(Includes 20 varieties and seedlings)	555973	94.4%
		of Total Amount Received by Handlers

587571 Total Reported Bushels

[fol. 443]

FLORIDA AVOCADOS

1958-1959
ANNUAL REPORT

Variety	Bushels	% of Total Reported Crop
Lula	74679	43.53
Booth 8	22084	12.87
Waldin	12808	7.46
Booth 7	11808	6.88
Seedlings	9099	5.30
Taylor	7719	4.50
Booth 1	5787	3.37
Pollock and Simmonds	3667	2.13
Hickson	3510	2.04
Collinson	3427	1.99
Monroe	1558	.91
Fuehs	1552	.90
Hall	1540	.89
Wagner	1523	.88
Linda	1412	.82
Trapp	1396	.81
Booth 3	1291	.75
Choquette	1207	.70
Ajax B-7-8	999	.58
Tonnage	831	.48
Herman	513	.29
(Includes 21 varieties and seedlings)	168410	98.08%
		of Total Amount Received by Handlers
171531 Total Reported Bushels		

[fol. 444]

FLORIDA AVOCADOS

1959-1960
ANNUAL REPORT

Variety	Bushels	% of Total Reported Cmp
Booth 8	92209	27.24
Lula	69726	20.60
Booth 7	43852	12.95
Waldin	30980	9.15
Hickson	15437	4.56
Seedlings	13739	4.05
Booth 1	11243	3.32
Booth 3	8519	2.51
Taylor	6281	1.85
Collinson	3957	1.16
Tonnage	3762	1.11
Monroe	3752	1.10
Hall	3526	1.04
Ajax B-7-8	2929	0.86
Choquette	2602	0.76
Trapp	2574	0.76
Fuchs	2169	0.64
Wagner	1553	0.45
Simmonds	1231	0.36
Booth II	888	0.26
Herman	768	0.22
Simpson	748	0.21
Linda	693	0.20
Booth 5	597	0.17
Hardee	522	0.15
(Includes 24 varieties and seedlings)	324257	95.68% of Total Amount Received by Handlers.

338453 Total Reported Bushels

[fol. 445]

DEFENDANTS' EXHIBIT F

**SUPERIOR COURT OF THE STATE OF CALIFORNIA
IN AND FOR THE COUNTY OF SACRAMENTO.**

**SUMMONS
SUPERIOR COURT**

PEOPLE OF THE STATE OF CALIFORNIA, Plaintiff

—vs.—

FLORIDA LIME AND AVOCADO GROWERS, INC., a Florida corporation, and SOUTH FLORIDA GROWERS ASSOCIATION, INC., a Florida corporation, Defendants

THE PEOPLE OF THE STATE OF CALIFORNIA TO:
FLORIDA LIME AND AVOCADO GROWERS, INC., a Florida corporation, and SOUTH FLORIDA GROWERS ASSOCIATION, INC., a Florida corporation.

You are hereby directed to appear and answer the complaint filed in the County of Sacramento in an action entitled as above, brought against you in the Superior Court of the State of California in and for the County of Sacramento, within ten days after the service on you of this summons—if served within said County, or within thirty days if served elsewhere.

You are hereby notified that unless you appear and answer as above required, the said plaintiff will take judgment for any money or damages demanded in the complaint as arising upon contract, or will apply to the Court for any other relief demanded in the complaint.

Witness my hand and seal of the Superior Court of the State of California, in and for the County of Sacramento this AUG 17 1960.

C. C. LARUE, Clerk, by R. WHIPPLE, Deputy

STANLEY MOSK,

Attorney General of the State of Calif.

JOHN FOURT,

Deputy Attorney General

(SEAL)

Attorneys for Plaintiff.

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STANLEY MOSK, Attorney General
of the State of California

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ENDORSED

Filed Aug 17
C. C. LARUE,
By R. WHIPPLE,

IN THE SUPERIOR COURT OF THE STATE OF CALIFORNIA
IN AND FOR THE COUNTY OF SACRAMENTO

No. 125826

COMPLAINT FOR DECLARATORY JUDGMENT
PEOPLE OF THE STATE OF CALIFORNIA, Plaintiff
—vs.—

FLORIDA LIME AND AVOCADO GROWERS, Inc., a Florida corporation, and SOUTH FLORIDA GROWERS ASSOCIATION, a Florida corporation, Defendants

Comes now the plaintiff People of the State of California and alleges: }

I

That the defendants Florida Lime and Avocado Growers, Inc., and South Florida Growers Association, Inc., corporations chartered by the State of Florida and their corporations are handlers of avocados grown in Florida and desire to sell avocados grown in Florida into the State of California without complying with the provisions of section 792, Agricultural Code.

II

That on November 13, 1957, defendants filed the action "Florida Lime and Avocado Growers, Inc., a Florida [fol. 447] corporation, and South Florida Growers Association, Inc., a Florida corporation, vs. W. C. Jacobsen, Director of Agriculture of the State of California, Goodwin J. Knight, Governor of the State of California, and Edmund G. Brown, Attorney General of the State of California," in the United States District Court, Northern District of California, Northern Division, No. 7648; that in said action No. 7648 defendants Jacobsen, Knight and Brown have been replaced as parties defendant by William E. Warne, California Director of Agriculture, Edmund G. Brown, Governor of the State of California, and Stanley Mosk, Attorney General of the State of California; that the defendants Warne, Brown and Mosk are sued in said action No. 7648 in their official capacities as officers of the State of California; that a copy of the complaint in said action No. 7648 and a copy of each of the orders entered in said action substituting defendants are attached hereto as Exhibits A, B and C, respectively, and are incorporated by reference as though fully set forth at this point; that a copy of the defendants' answers in said action No. 7648 are attached hereto as Exhibits D and E and incorporated by reference as though fully set forth at this point.

III

That a controversy exists between the defendants and the plaintiff hereto, to wit: That defendants herein assert that section 792, Agricultural Code, is unconstitutional under the commerce and equal protection clauses of the United States Constitution and is in conflict with the federal Marketing Agreement Act of 1937; that plaintiff herein asserts that section 792, Agricultural Code, constitutes a valid exercise of the California police power.

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IV

That the Superior Court for the County of Sacramento, State of California, has jurisdiction of this action and of

the parties under 28 U.S.C. 2284(5) and Article V, section 21, California Constitution, and section 1060, Code of Civil Procedure.

V

That an authoritative construction by the California courts of section 792, Agricultural Code, in the light of the defendants' allegations of unconstitutionality and of validity would moot or present in a different posture federal constitutional issues raised in said federal District Court action No. 7648.

WHEREFORE, plaintiff prays for judgment declaring the section 792, Agricultural Code, constitutes a valid exercise of the state police power as applied to avocados grown in California and tendered for sale by said defendants in California; and for such other and further relief as may be meet and just in the premises.

29
STANLEY MOSK, Attorney General
of the State of California
JOHN FOURT, Deputy Attorney General

By /s/ JOHN FOURT
Attorneys for Plaintiff

State of California,
County of Sacramento, ss.

No. 13668 A

I, C. C. LaRue, County Clerk of the County of Sacramento, State of California, and ex-officio Clerk of the Superior Court held in and for said County and State aforesaid, hereby certify that I have compared the foregoing copy with the original instrument on file and of record in my office, and that the same is a full, true and correct copy of such original, with the endorsements thereon, and the whole thereof.

Attest my hand and seal of said Court this Aug 17 19-

C. C. LaRUE, County Clerk

By /s/ R. WILBURX, Deputy Clerk
(Seal)

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EXHIBIT A

Complaint for injunction entitled "Florida Lime and Avocado Growers v. W. C. Jacobsen, No. 7648" with attached exhibits. (Copy omitted. Printed side folio 1, printed page 1 ante.)

[fol. 473]

EXHIBIT B

Order granting leave to plaintiffs to amend and supplement complaint. (Copy omitted. Printed side folio 524, printed page 523.)

[fol. 475]

EXHIBIT C

Order granting leave to plaintiffs to amend and supplement complaint. (Copy omitted. Printed side folio 522, printed page 522.)

[fol. 477]

EXHIBIT D

Answer of William E. Wayne. (Copy omitted. Printed side folio 528, printed page 524.)

[fol. 481]

EXHIBIT E

Answer of Edmund G. Brown and Stanley Mosk. (Copy omitted. Printed side folio 532, printed page 527.)

[fol. 485]

EXHIBIT P

Date	To	Flats	Boxes	Return and Amount Lot #	Average	Invoice No
10-29-54	Oakland	✓ 650 ✓	52	2612.81	4.58	18386
2 11-9-54	San Diego	✓ 300 No Trans. 2883		1018.32	\$ 3.96	18494
3 11-10-54	Oakland	✓ 650 No Trans. 62		2716.56	4.75	18499
4 11-11-54	Los Angeles	✓ 650 ^{ME450L#} 539-RJ# 2332 *		2212.66	4.14	18508
5 11-11-54	Los Angeles	✓ 650 No Trans. 22331		2562.61- AHL#	4.57	18509
6 11-12-54	Los Angeles	✓ 650 ^{ME450L#} 97-RJ# 2335 *		2462.98 < ⁵⁵³ 97 3.90 >	4.43	18517
7 10-10-54	Los Angeles	✓ 449 ^{ME450L#} 116-RJ# 2330 *		2103.79 ME450L# 3.66	3.66	18500
8 11-12-54	Los Angeles	✓ 650 No Trans. 2336		2415.27	4.55	18518
9 11-13-54	Oakland	✓ 450 No Trans. 66		1788.46	4.52	185.28
10 11-13-54	San Francisco	✓ 200	66	794.87	4.52	18529
11 11-15-54	Oakland	✓ 650 No Trans. 68		2693.59	4.71	18544
12 11-16-54	San Diego	✓ 500 No Trans. 2894		660.00	1.50	18565
13 11-18-54	Los Angeles	✓ 650 ^{578 62.97-LP} 72 F 3.01-P 2342 *		1882.43	2.97	18581
14 11-19-54	Los Angeles	✓ 650 No Trans. 2343		1409.47	2.66	18594